CONTRIBUTIONS FROM THE NEW YORK BOTANICAL GARDEN—No. 96

STUDIES ON THE ROCKY MOUNTAIN FLORA—XVIII

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NEW YORK
1907

[From the BULLETIN OF THE TORREY BOTANICAL CLUB 34: 417–437. 1907]

[From the Bulletin of the Torrey Botanical Club, 34: 417-437. 1907.]

Studies on the Rocky Mountain flora — XVIII

Per Axel Rydberg

Homalobus divergens (Blankinship) Rydb.

Astragalus divergens Blankinship, Mont. Agric. Coll. Sci. Stud. Bot. **1**: 73. 1905.

Homalobus camporum Rydb. Bull. Torrey Club **32**: 666. 1906.

When I described *Homalobus camporum* I overlooked the facts that the same species had already been published by Prof. Blankinship and that he had even cited the type number of my type. He had described the pod, however, as having a stipe, something that I cannot find in any specimens at hand.

Homalobus humilis sp. nov.

Perennial with a cespitose caudex; stems 2–10 cm. long, grayish-strigose, decumbent or spreading; stipules ovate, scarious, 2–3 mm. long; leaves 2–6 cm. long; leaflets 11–15, oblong, 3–6 mm. long, about 2 mm. wide, grayish-strigose beneath, glabrate above; peduncles 2–8 cm. long; raceme short, 1–2 cm. long, 3–8-flowered; calyx strigose with black hairs; tube campanulate, 1.5–2 mm. long; teeth triangular or triangular-subulate, 1–1.5 mm. long; corolla purple, 7–8 mm. long; legume about 1.5 cm. long, 3 mm. wide, widest near the abruptly acute apex, tapering towards the base, the upper suture nearly straight, the lower strongly arched at the apex.

This species most resembles *H. divergens* (Blankinship) Rydb. in habit, but differs in the shape of the legumes, the darker corollas, and in the less canescent leaves, which are glabrate above. It grows on high arid mountain tops at an altitude of nearly 3,000 m.

Utah: Mountain north of Bullion Creek, near Marysvale, 1905, *Rydberg & Carlton 7147* (type); Delano Peak, 1905, *nos. 1219* and *1219 a*.

Homalobus microcarpus sp. nov.

Homalobus campestris Rydb. Bull. Agr. Exp. Sta. Col. **100**: 209, in part. 1906. Not *H. campestris* Nutt.

Homalobus camporum Rydb. *loc. cit.*, in part.

Perennial with a cespitose caudex; stems decumbent, about 1 dm. high, strigose; leaves 5–8 cm. long; stipules ovate, scarious, 2–3 mm. long; leaflets 9–15, elliptic to linear, 5–15 mm. long, 1–3 mm. wide, glabrous above, sparingly strigose beneath; peduncles 4–6 cm. long; racemes short, 3–8-flowered; calyx strigose with black hairs; tube campanulate, about 2 mm. long; teeth about 1 mm. long, subulate; pod sessile, strigose, straight, 12–18 mm. long, 3 mm. wide.

This species is intermediate between *H. oblongifolius* Rydb. and *H. divergens* (Blankinship) Rydb. Baker's specimens from North Park were referred to the latter, which the present species resembles in general habit and the pod; but it is a greener plant, the leaflets being glabrous above and only slightly strigose beneath. The smaller size, and the smaller pod of a different shape, separate it from *H. oblongifolius*.

COLORADO: East slope of Rabbit Ear Range, 1894 (type distributed from the State Agricultural College of Colorado, collector not given); Forks of Poudre and Big South, 1894; North Park, 1897, *C. F. Baker;* Steamboat Springs, 1903, *Osterhout 2774.*

Homalobus paucijugus sp. nov.

Perennial with a cespitose caudex, bushy; stems 1–2 dm. high, sparingly strigose; leaves numerous, 5–10 cm. long; leaflets 1–5, the lateral ones lanceolate to linear-subulate, 1 cm. or less long, glabrous above, sparingly strigose beneath, or none; the terminal one 1–2 cm. long, linear or linear-oblanceolate, gradually tapering into the rachis; stipules scarious, ovate, 2–3 mm. long; peduncles 3–6 cm. long; racemes short, 3–6-flowered; calyx strigose with black hairs; tube campanulate, about 2 mm. long; teeth subulate, fully 1 mm. long; legume 12–15 mm. long, 2 mm. wide, straight, strigose.

This species resembles *H. decurrens* in the peculiar terminal leaflet, but differs in the few small and narrow lateral leaflets, the small size of the plant, the small flowers and the small pod. It grows at an altitude of nearly 3000 m.

UTAH: Big Cottonwood Cañon, in sheltered places near the summit of the divide between Lake Solitude and Twin Lakes, 1905, *A. O. Garrett 1580.*

The species confused with *H. tenellus* and usually included in it may be distinguished by the following characters:

Legume glabrous.
- Stipe rarely exceeding the tube of the calyx; leaves usually spreading in age; leaflets oblong to oval, obtuse and mucronate. *H. dispar.*
- Stipe of the mature legume usually exceeding the calyx-teeth; leaves strongly ascending; leaflets narrowly linear to linear-oblong, mostly acute.
  - Stipe 3–4 mm. long; leaflets linear or linear-oblong; stem usually conspicuously strigose; calyx-teeth half as long as the tube. *H. tenellus.*
  - Stipe 5–7 mm. long; leaflets narrowly linear; stem glabrous or nearly so; calyx-teeth usually nearly equaling the tube. *H. stipitatus.*

Legume strigose. *H. strigulosus.*

HOMALOBUS DISPAR Nutt.; T. & G. Fl. N. Am. 1: 350. 1838.

Orobus dispar Nutt. Gen. 2: 95. 1818.

This is much less common and has a more restricted range than *H. tenellus.* The range of *H. dispar* includes the extreme western portion of Nebraska, Wyoming, northern Colorado and northeastern Utah, while that of *H. tenellus* extends from Saskatchewan to Nebraska, Colorado, Utah, and the Yukon Territory.

Homalobus stipitatus sp. nov.

Somewhat cespitose perennial; stems slender, 3–4 dm. high, erect, branched, sparingly strigose or glabrate, leafy; leaves strongly ascending, 4–6 cm. long; stipules lance-subulate; leaflets 9–15, narrowly linear, 1–2 cm. long, 1–2.5 mm. wide, glabrous or sparingly strigose beneath; peduncles about 1 cm. long; racemes lax, 2–10 cm. long, 5–20-flowered; calyx strigose; tube campanulate, about 1.5 mm. long; teeth subulate, about as long; corolla ochroleucous, 8–10 mm. long; legume glabrous, stipitate, flat; body oblong, about 1 cm. long, 3 mm. wide, acute, gradually tapering into the stipe, which is 5–7 mm. long.

This species is related to *H. tenellus* (Pursh) Britton [*Astragalus multiflorus* (Pursh) A. Gray], but is a more slender and more glabrate plant, with narrower leaflets and longer stipe. It belongs to the prairie region east of the range occupied by *H. tenellus.*

NORTH DAKOTA: "Upper Missouri" [from the data given in Nicollet's report, on the hills somewhere between Fort Pierre and Devil's Lake], 1839, *Geyer* (type in herb. Columbia University); Valley City, 1897, *L. L. Perrine.*

MINNESOTA: Lake Belmont, Otter Tail Co., 1892, *E. P. Sheldon.*

SASKATCHEWAN: 1858, *E. Bourgeau 4.*

Homalobus strigulosus sp. nov.

Cespitose perennial; stems erect or ascending, branched, 1–3 dm. high, strigulose; stipules short, ovate; leaves 3–4 cm. long; leaflets linear, acute, 8–12 mm. long, 1–2 mm. wide, thick, glabrous above, strigose beneath; peduncles 1 cm. or less; raceme lax, 1.5–3 cm. long, 4–7-flowered; bracts minute, subulate; calyx strigulose; tube campanulate, 1.5 mm. long; teeth subulate, less than 1 mm. long; corolla ochroleucous, about 6 mm. long; pod strigose, shining, stipitate; body oblong, 7–8 mm. long, 3 mm. wide, rather gradually contracted into the stipe, which is about 3 mm. long.

This is closely related to *H. tenellus*, but differs in the smaller flowers and the smaller and hairy pod. It grows at an altitude from 1800–3000 m.

NEVADA: East Humboldt Mountains, 1860, *S. Watson 283* (type).

UTAH: P. V. Junction, Wasatch Mountains, 1883, *M. E. Jones* (mixed with *H. tenellus*).

Diholcos micranthus sp. nov.

Somewhat cespitose perennial; stems erect or ascending, sparingly strigose or glabrate, 2–4 dm. high; stipules ovate, about 5 mm. long; leaves 4–6 cm. long; leaflets 17–25, linear or lance-oblong, acute at both ends, 7–20 mm. long, glabrous above, strigose beneath; peduncles 4–7 cm. long; racemes many-flowered, 3–7 cm. long; calyx strigose; tube campanulate, slightly gibbous, 2–2.5 mm. long; teeth subulate-filiform, 1–2 mm. long, the upper somewhat shorter; corolla 6–7 mm. long, ochroleucous; pod strigose, obsoletely if at all cross-ribbed; stipe 3–4 mm. long; body scarcely 1 cm. long, 3 mm. wide, very acute.

This species is related to *D. Haydenianus* (A. Gray) Rydb. [*Astragalus Haydenianus* A. Gray], differing in the smaller flowers and fruit, the more acute leaflets, the narrower calyx-lobes, and especially the almost total lack of cross-ribs on the more acute legumes. *D. micranthus* was included in *D. Haydenianus* in my Flora of Colorado.

COLORADO: La Veta, 1896, *C. L. Shear 3569* (type); Gunnison, 1896, *Clements 100;* Ridgeway, 1895, *Tweedy 228;* Rio Blanco, south of Pagosa, 1883, *B. H. Smith.*

Kentrophyta minima sp. nov.

Perennial with a woody root and cespitose caudex, forming cushions 1 dm. in diameter; herbaceous stems 1–2 cm. high;

leaves 5–8 mm. long; stipules scarious, lanceolate, 1–3 mm. long, more or less united; leaflets 5–9, linear-lanceolate, conduplicate, pungent, 3–4 mm. long, finely strigose; flowers usually solitary, subsessile; calyx strigose; tube 1–1.5 mm. long, campanulate; teeth subulate, scarcely 1 mm. long; corolla ochroleucous, about 3 mm. long; keel tipped with purple; pod ovoid, rather turgid, acute, 3 mm. long.

This is related to **K. tegetaria** (S. Wats) Rydb. [*Astragalus tegetarius* S. Wats.] and *K. Wolfii* Rydb. From the former it differs in the subsessile flowers and the shorter calyx-lobes; *K. tegetaria* has 1–3-flowered racemes, exceeding the leaves in length and calyx-lobes which are longer than the tube. From *K. Wolfii*, it differs in the appressed pubescence, the smaller flowers and the shorter legume. It is an alpine species growing at an altitude of 2800–3100 m.

YELLOWSTONE NATIONAL PARK: August 1884, *Tweedy 83* (herb. Columbia Univ.).

Aragallus patens sp. nov.

Acaulescent perennial; leaves spreading or ascending, 5–10 cm. long; leaflets 9–17, elliptic or oblong, acutish at both ends, 1–2 cm. long, 4–6 mm. wide, somewhat silvery with closely appressed hairs; scape 1–1.5 dm. high, strigose with short silky hairs; raceme short, 3–7 cm. long; bracts linear-lanceolate to lanceolate, 5–8 mm. long; flowers usually spreading; calyx sparingly appressed-silky with short hairs, often somewhat tinged with purple above, 5–6 mm. long, 3 mm. wide; teeth subulate, the upper 2 mm., the lower 3 mm. long; corolla dark bluish-purple, about 15 mm. long; banner narrow; wings broad, slightly emarginate, the upper lobes narrow and acutish; keel with a very dark purple spot, and a short, porrect tip; legume ascending-spreading, thin-coriaceous, nearly straight, less than 2 cm. long, 4 mm. thick, long-acuminate, minutely strigose, half 2-celled.

This is related to *A. Lambertii* and *A. sericeus*. From the former it differs in the shorter and broader leaflets and the more spreading leaves; from the latter in being greener, less hairy, and having narrower bracts and calyx-tube and darker flowers, and from both in the smaller size, thinner and more spreading legumes and smaller flowers.

COLORADO: Plains and foothills near Boulder, 1902, *F. Tweedy 5164* (type); between Sunshine and Ward, *no. 5165;* Eldora to

Baltimore, *no. 5634;* Sargents 1901, *C. F. Baker 344;* Cimarron, *no. 277.*

WYOMING: Laramie Plains, 1903, *Goodding 1422;* Centennial, 1900, *Aven Nelson 7680.*

NEBRASKA: Hay Springs, 1901, *MacDougal 44.*

Aragallus angustatus sp. nov.

Acaulescent perennial; leaves spreading or ascending, 6–10 cm. long; leaflets 7–13, narrowly linear-lanceolate to narrowly linear, 1–2 cm. long, 2–4 mm. wide, sparingly strigose; scape about 1 dm. high, sparingly strigose; raceme 3–5 cm. long; bracts lanceolate, about 5 mm. long; calyx finely silky-strigose; tube 5–6 mm. long; teeth subulate, about 2 mm. long; corolla purple, 15 mm. long or less; banner rather broad; wings broad and slightly emarginate; keel with a very dark blue-purple spot and a very short porrect tip; legume ovoid, less than 1.5 cm. long, coriaceous, 3.5 mm. thick, rather abruptly contracted into a spreading beak, minutely strigose, half 2-celled.

This resembles, somewhat, a low, narrow-leaved *A. Lambertii*, but differs in the more spreading leaves, and smaller, more spreading flowers, and especially by the short pod, with an abrupt spreading beak. The specimen designated as the type has the best developed fruit.

NEBRASKA: Hills, Rush Creek, 1891, *Rydberg 82c* (fruit, type in herb. Columbia Univ.); prairies, Banner Co., *no. 82a*, in part (fruit); hills, Banner Co., *no. 82b* (flowers); Hay Springs, 1901, *MacDougal 64b* (flowers).

ARAGALLUS BLANKINSHIPII A. Nelson

Prof. J. W. Blankinship * writes:

"*Oxytropis Besseyi* (Rydberg); *Aragallus Besseyi* Rydberg, Flora 250 is *A. Blankinshipii* Nelson, Erythea, 7: 58. The types of both were collected within a few miles of each other. The fruiting specimens of Nelson were pathogenic, infected with uredo, causing the ovary to remain undeveloped and an abnormal calyx, the legume in the species usually exceeding the calyx; otherwise they are identical."

This statement is only partly correct. Professor Blankinship some time ago sent us specimens of *Aragallus Blankinshipii* from

* Mont. Agr. College Sci. Stud. Bot. 1: 80. 1905.

the type collection. The flowering specimen is identical with my *A. Besseyi*, but the fruiting specimen is not. The flowering specimen has long linear-subulate calyx lobes, 4 mm. long, and linear-lanceolate, acute bracts, while in the fruiting specimen the calyx-lobes are almost triangular and about half as long and the bracts lance-oblong and obtuse. If the fruit of the type sheet is infected by uredo, there is no evidence of it in the duplicate here at the Botanical Garden. The trouble is that *Aragallus Blankinshipii* was described from flowering specimens of one species (*A. Besseyi*) and fruiting specimens of another. They are both well known to me. I intended to describe the second species in the Flora of Montana when in the meantime Professor Nelson's article in Erythea appeared. I had no authentic specimens of his new species. As I knew of no species answering to Professor Nelson's description of *A. Blankinshipii*, never suspecting it to be a composite one, and knowing one agreeing fairly with his description of *A. collinus* except as to the color of the corolla, I referred the specimens of my supposed new species to this. The New York Botanical Garden has since received authentic specimens of both *A. Blankinshipii* and *A. collinus* and I have been able to correct my mistake. The specimens referred to *A. collinus* in my Flora of Montana are specifically the same as the fruiting specimens of *A. Blankinshipii*. Mr. Gooding has also collected good fruiting specimens in Wyoming at Alcona, Natrona County, in 1901 (*no. 147*). These were determined as *A. Blankinshipii*.

This species is closely related to *A. nanus*, differing mostly in the erect stiff scape and more elongated spike. *A. Besseyi*, together with *A. argophyllus*, forms a small group more related to *A. Lambertii*.

I adopt the name *A. Blankinshipii* for this species, represented by the fruiting specimens of the original description for the following reasons: (1) Prof. Nelson has laid most stress on the structure of the pod, associating *A. Blankinshipii* with *A. collinus*, *A. multiceps*, *A. Lagopus* and *A. nanus*, to which this species is related; (2) The characters of the fruit in the genus *Aragallus* are more reliable then those of the flowers to show the actual relationship; (3) The species represented by the flowering specimens has already received a name. The synonymy of the two species is as follows:

ARAGALLUS BLANKINSHIPII A. Nelson Erythea **7**: 58 (fruiting specimens). 1899.

Aragallus collinus Rydb. Mem. N. Y. Bot. Garden. **1**: 254. 1900. Not *A. collinus* A. Nelson 1899.

ARAGALLUS BESSEYI Rydb. Mem. N. Y. Bot. Garden **1**: 250. 1900.

Oxytropis argentata Pursh Fl. Am. Sept. 473. 1814. Not. *O. argentata* Persoon.

Aragallus Blankinshipii A. Nelson, Erythea, **7**: 58 (flowering specimens). 1899.

Aragallus monticolus A. Nelson, Erythea **7**: 62, in part. 1899. Not *Oxytropis monticola* A. Gray.

Oxytropis Besseyi Blankinship, Mont. Agr. Coll. Sci. Stud. Bot. **1**: 80. 1905.

Aragallus atropurpureus sp. nov.

Acaulescent perennial; leaves numerous, 3–7 dm. long; leaflets oval to oblong, canescently silky-villous, 5–15 mm. long, 3–5 mm. wide, obtuse or acute; scape 6–10 cm. long, loosely villous; raceme short and headlike; 2–3 cm. long; bracts linear-subulate, 5–10 mm. long; calyx dark, villous with mixed black and white hairs; tube 5 mm. long, 3 mm. wide; teeth black-hairy, subulate, 4 mm. long; coralla dark-purple, about 15 mm. long; wings deeply emarginate; keel with a rather long ascending tip; legume ovoid, less than 1.5 cm. long, 15 mm. thick, abruptly acuminate with a spreading beak, villous, partly black-hairy, thin, half 2-celled.

In pubescence and leaf-form, this species most resembles *A. sericeus*, but it is a much smaller plant, has only half 2-celled, shorter and more curved pod. It is easily distinguished from all the other purple-flowered species of the *A. Lambertii* group by the black-hairy calyx and long calyx-teeth.

WYOMING: Headwaters of Tongue River, Big Horn Mountains, 1898, *F. Tweedy 125* (type, in flower); *no. 126* (in fruit).

Hedysarum utahense sp. nov.

Perennial with a rootstock; stem 4–6 dm. high, finely strigose, stipules triangular, acuminate, 5–8 mm. long; leaves –15 cm. long; leaflets 11–17, elliptic, oval or oblong, usually rounded at both ends, 1–3 cm. long, 5–10 mm. wide, glabrous above, finely

cinereous-strigose or more glabrate beneath; peduncles about 1 dm. long; raceme 4–10 cm. or in fruit even 2 dm. long; bracts ovate to lanceolate, scarious; calyx cinereous-strigose; tube nearly 3 mm. long; teeth lance-subulate, 5 mm. long, attenuate; corolla rose-purple; banner 15–18 mm. long; keel 18–20 mm.; loments minutely strigose; internodes 2–5, 6–8 mm. long, 5–6 mm. wide; nodes narrow, 2.5 mm. or less.

This is related to the subarctic *H. Mackenzii*, from which it differs in the denser pubescence on its calyx, its broader calyx-teeth, its fewer and larger internodes of the loment, its taller habit, broader bracts and lighter and redder flowers. It grows on hillsides at an altitude of 1400–2000 m.

UTAH: Vicinity of Salt Lake City, 1883, *Leonard 55* (type); 1900, *Stokes;* 1869, *Watson 294;* near Ogden, *Coulter; Stansbury;* Wahsatch Mountains, 1888, *Dr. Eccles.*

Lathyrus brachycalyx sp. nov.

Perennial with a creeping rootstock; stem simple or slightly branched, 1.5–3 dm. high, usually finely pubescent, sharply 4-angled; stipules semi-sagittate, 5–10 mm. long, 1.5–3 mm. wide, pubescent; rachis 2–5 cm. long, somewhat winged; leaflets 2–5 pairs, linear-oblong or oblanceolate, firm, strongly veined, finely pubescent, acute at both ends, 1–3 cm. long, 2–8 mm. wide; tendrils of the lower leaves reduced to mere tips, those of the upper leaves better developed, but usually simple; peduncles 5–10 cm. long; raceme short, 2-6-flowered; calyx puberulent; tube 4–5 mm. long; upper teeth broadly triangular, scarcely 2 mm. long, the rest lance-subulate, the lowest one 3 mm., rarely 4 mm. long; corolla purple, 2–2.5 cm. long; legume glabrous, 3–4 cm. long, 7 mm. wide.

This species has been confused with *L. decapetalus* and is closely related to it. It differs in the much shorter calyx-tube and calyx-teeth, the broader, more upturned banner, the more pubescent foliage and less well developed tendrils. It grows on hillsides and in cañons and washes at an altitude of 1400–2500 m.

UTAH: City Creek Cañon, 1883, *F. E. Leonard 101* (type), *20* and *29;* 1900, *S. G. Stokes;* 1880, *M. E. Jones 1700;* near Salt Lake City, 1904, *Garrett 998;* 1905, *Rydberg 6162;* Mt. Majestic, *Garrett 1656;* Mount Nebo, 1902, *Goodding 1105;* Wahsatch Mountains, 1869, *S. Watson 295.*

Capnoides hastatum sp. nov.

Glabrous green perennial, 1–1.5 m. high, branched above; leaves 2–4 dm. long, thrice pinnatifid; ultimate divisions elliptic or oval, 1–2 cm. long, mucronate; racemes 1 dm. long or more; bracts oblanceolate, about 1 cm. long; pedicels about 3 mm. long; sepals narrowly hastate with broad often toothed, divergent basal lobes, about 2 mm. long; corolla with the spur 15–18 mm. long, salmon-pink; hood scarcely crested.

This species is closely related to *C. Cusickii* (S. Wats.) Heller, but differs in the smaller corolla, less crested hood and the sepals which are hastate instead of reniform and laciniate.

IDAHO: Lolo Creek, 1902, *C. V. Piper 4057* (type in herb. N. Y. Bot. Garden).

Capnoides brachycarpum sp. nov.

Glabrous and glaucous perennial with thick root; stem 3–6 dm. high, branched above; leaves 2–3 dm. long, thrice pinnatifid; ultimate divisions lanceolate or lance-elliptic, 2–3 cm. long, 5–12 mm. wide; racemes 1–2 dm. long, the upper often branched; bracts linear-subulate, about 5 mm. long; pedicels ascending, about 5 mm. long; sepals ovate, acute, 2–3 mm. long with toothed auricles at the base; corolla, including the spur, about 15 mm. long, yellowish, the inner petals tipped with purple or brown; spur about the length of the body of the petals, horizontal; crest of the hood obsolete; pod horizontal or reflexed, obovoid, about 1 cm. long and 6 mm. wide.

This species was included in the original description of *Corydalis Brandegei* S. Wats., but the type of the latter and all Colorado specimens can easily be distinguished by the green, scarcely glaucous foliage, the broader oval or obovate mucronate divisions of the leaves, the broader and obtuse sepals, the longer corolla, which is fully 2 cm. long and has an almost erect spur, and the fruit, which is fully 1.5 cm. long but scarcely more than 4 mm. thick. *C. brachycarpum* grows along streams at an altitude of nearly 3000 m.

UTAH: Alta, 1879, *M. E. Jones 1197* (type in herb. N. Y. Bot. Gard.); 1905, *Rydberg 6848;* Silver Lake, American Fork Cañon, 1895, *M. E. Jones;* Wahsatch Mountains, 1884, *Leonard 175*.

Lepidium Crandallii sp. nov.

L. Jonesii Rydb. Bull. Ag. Ex. Sta. Colo. **100**: 152, in part. 1906.
L. Eastwoodiae Rydb. *l. c.* in part.

Perennial; stems several, branched and leafy throughout, glabrous or puberulent above, 3–5 dm. high; basal leaves and lower stem-leaves pinnatifid, 5–7 cm. long, glabrous, with oblanceolate or oblong, entire or slightly toothed divisions; upper stem-leaves, especially those of the branches, oblanceolate or linear, entire or toothed; sepals oblong, nearly 2 mm. long, white-margined; petals clawed, about 3 mm. long, white, their blades obovate; stamens 6; fruiting racemes 5–10 cm. long; pedicels divergent; pods oval or ovate, about 4 mm. long, glabrous, slightly wing-margined above; style 1 mm. long, about twice as long as the wing-margin.

This species is related to the two species to which it has been referred and to *L. allyssoides*. From the latter and *L. Eastwoodiae* it differs in the more commonly dissected stem-leaves, the broader and shorter segments of the leaves and the comparatively longer style. From *L. Jonesii* it differs in the broader leaf-segments, thinner leaves, and more branched habit. From *L. scopulorum* it differs in the less woody base, the branched and leafy stem, thinner leaves and shorter styles.

COLORADO: Palisades, May 14, 1898, *Crandall 131* (type in herb. N. Y. Bot. Gard.); Glenwood Springs, 1902, *Osterhout 2599*;

Lepidium brachybotryum sp. nov.

Biennial or perennial with a tap-root; stem 2–3 dm. high, branched, puberulent throughout; basal leaves puberulent, bipinnatifid, about 5 cm. long, with elliptic or obovate lobes; stem-leaves oblanceolate, pinnatifid or toothed; sepals oblong, about 1 mm. long, white-margined; petals white, clawed, 2 mm. long, their blades broadly obovate; stamens 6; fruiting racemes short, 2–5 cm. long; pedicels divergent, 5–7 mm. long; pod rounded-ovate, 3 mm. long, 2.5 mm. wide, wing-margined above; styles less than 0.5 mm. long, scarcely exceeding the wing-margins.

This is related to *L. montanum* but differs in the short style, more rounded pods, and short racemes. It grows on sage-brush flats.

UTAH: Juab, 1902, *Goodding 1075* (type in herb. N. Y. Bot. Gard.); Wasatch County, near Midway, *Carlton & Garrett 6728* (poor specimen doubtfully referred here).

Lepidium Fletcheri sp. nov.

Annual or biennial; stem erect, 3–5 dm. high, puberulent with short cylindric spreading hairs, branched above with ascending branches; leaves narrow, pinnatifid with linear divisions or saliently toothed, 2–5 cm. long, puberulent; those of the inflorescence linear and entire; sepals oblong, scarcely 1 mm. long, green, with white margins; petals none; stamens usually 2, scarcely exceeding the sepals; fruiting racemes 3–5 cm. long; pedicels 4 mm., terete; pod glabrous, scarcely 3 mm. long, obovate in outline, glabrous, strongly wing-margined above; lobes of the wings nearly 0.5 mm., triangular-ovate, acutish or obtuse; seed 1 mm. long, brown, wingless.

This species is related to *L. densiflorum* and *L. ruderale*, but differs from both in the deeper, more open notch of the pod and the prominent lobes of the wing. From the former it differs also in the smaller pod and the narrow divisions of the leaves and from the latter in the leaves, of which none, apparently, are bipinnatifid. In the fruit it resembles *L. Bourgeauanum* Thelling, but differs in the simple erect habit and in the pinnatifid leaves.

MANITOBA: Roadsides, Winnipeg, 1905, *J. Fletcher* (type in herb. N. Y. Bot. Gard.); apparently also

SASKATCHEWAN: Cherryfield, 1906, *Macoun & Herriot 69881*.

THELYPODIUM Endl.

This genus as treated in the Synoptical Flora represents at least half a dozen different types of plants. Whether they should be regarded as one or more genera depends upon the individual tastes and inclinations of the botanist treating them. Dr. Greene, in splitting up the genus *Streptanthus*, expressed the opinion that either these two genera, *Stanfordia* and *Caulanthus*, should be united into one, or else *Streptanthus* should be divided into several. The writer agrees so far with Dr. Greene and thinks that *Thelypodium* and *Caulanthus* should be treated the same way. He has not been able to follow Dr. Greene in his segregation, however, partly because he does not know well enough the West American species treated by Dr. Greene, and partly because his opinions differ considerably in some cases. One of these cases will be given below.

Thelypodium was established by Endlicher, and based wholly

on *Pachypodium* Nutt.* A generic diagnosis was given but no species were cited. In Walpers' Repertorium (1 : 172), the genus was again taken up and the three species of *Pachypodium* found in Torrey and Gray's Flora, were taken up in the same order as these. Hence *Thelypodium* is a mere substitute for *Pachypodium*, which name had been used for another genus, and the type of the latter genus is the type of the former. The three species of *Pachypodium* are the following, given in the order in which they appear: *P. laciniatum*, *P. integrifolium*, *P. sagittatum*. The last of the three need not be considered, for in Torrey and Gray's Flora it is regarded as doubtfully belonging to the same genus as the preceding and perhaps belonging to a section of *Arabis*. The type of *Pachypodium* Nutt., and hence of *Thelypodium* Endl., must then be either *P. laciniatum* or *P. integrifolium*. There is nothing that points directly to either of the two, but everything favors the former. It is not only the first species mentioned, but it is also the only one previously known and figured. It was first described as *Macropodium laciniatum*. Hooker compared it with the original *M. nivale*, gave figures for both and emphasized the differences between the two, the oblong anthers and the long, slender pubescent stipe of *M. nivale* and the linear anthers and the short, stout stipe of *M. laciniatum*. Nuttall remarked "evidently not a *Macropodium*." It is evident that he selected the name *Pachypodium* from the short, stout stipe.

If *Macropodium laciniatum* Hook. is regarded as the type of *Thelypodium* Endlicher, and the writer can not regard it otherwise, the closest relatives of it we find in *T. utahense* Rydb. and the groups of *Thelypodia* on which Dr. Greene based his genus *Guillenia*. It is hard to see how *Thelypodium lasiophyllum* Greene, the type of the latter genus, can be generically distinct from *T. laciniatum* (Hook.) Endl. Every character pointed out by Dr. Greene for his *Guillenia* agrees with the latter and is even found in Hooker's description. It will be admitted that there are some habitual differences, by which *T. laciniatum* is isolated from *Guillenia*, but *T. utahense*, originally named *T. laciniatum*, has the habit of that genus, while the flower and fruit are essentially those of *T. lasiophyllum*.

* T. & G. Fl. N. Am. 1 : 96. 1838.

Dr. Greene evidently intended to include in *Guillenia*, *Arabis longirostris* or *Streptanthus longirostris*, but in enumerating the species of his new genus he has no *G. longirostris*. He has one *G. rostrata* based on *Arabis rostrata* S. Wats., a name the publication of which I have been unable to find. *Arabis longirostris* is hardly congeneric with *Telypodium lasiophyllum*, however. It has the flat pod of *Streptanthus*, but the short anthers, merely cordate at the base, and not spirally curved, place it as very doubtfully belonging to any of the Streptanthoid genera.

The second species of *Pachypodium* in Torrey and Gray's Flora, now usually known as *Thelypodium integrifolium* (Nutt) Endl., is so different in habit, that the writer has always found it hard to regard it as congeneric with the rest, but the differences in the structure of the flower and of the pod externally are so slight that a segregation based on habit alone would not be desirable. There is however, a character in the pod, unique to this species and two or three segregates from it and making them stand isolated from all the other Thelypodioid plants, viz., the strong and broad midrib of the septum of the pod. There is no distinct midvein in any of the typical *Thelypodia*.

A species closely resembling *T. integrifolium* in habit, foliage and flowers, is *T. linearifolium* or *Iodanthus* or *Streptanthus linearifolius*, but it lacks the rib on the septum. Besides it has two characters not found in the other *Thelypodia*. Two of the rather firm and purple sepals are strongly saccate at the base and the stigma is conical, not truncate nor 2-lobed as in the other species. It could be referred to *Hesperis*, which it resembles especially in the flowers, if it were not for the stipitate, terete pod and the curved anthers, which characters are strongly thelypodioid.

In describing the subgenus *Euthelypodium* in the Synoptical Flora, Dr. Robinson gives *T. elegans* Jones as an exception having a 2-lobed stigma with the lobes expanding over the septum. In the whole tribe the stigma is either undivided or else the lobes are expanded over the valves. This exceptional character is most pronounced in the species mentioned above, but it is also found in less degree in *T. aureum* Eastw. and *T. Bakeri* Greene. Mr. George Osterhout, of New Windsor, Colorado, who has collected a specimen of *T. elegans*, has written on the label: "near to

Streptanthus wyomingensis A. Nelson but probably rather a *Thelypodium*." This note made the writer compare the latter species. When *S. wyomingensis* was first described, it was thought that it was the closest relative of *S. maculatus* Nutt., the only original *Streptanthus*, but a closer comparison now has shown that the pod is not flat as in *Streptanthus* and the lobes of the stigma are turned the wrong way. Its relationship is with the three *Thelypodia* just mentioned above, with which it also agrees in habit.

Two other species of *Thelypodium* are said by Dr. Robinson to have the lobes of the stigma placed in the same way, viz.: *T. micranthum* and *T. longifolium*, but here that character is scarcely noticeable. There are other characters in which they disagree with the other *Thelypodia*. The branched or stellate pubescence is unique in the whole tribe and should place them according to the classification used in Engler & Prantl's Pflanzenfamilien in another grand division of the family. The stamens and the pods are, however, more or less thelypodioid. In both species the flowers are more or less irregular, the lower sepals being longer (this is best shown in *T. longifolium*) and there is scarcely any distinction between claw and blade in the petals.

The most interesting of the *Thelypodia* is perhaps *T. Wrightii*. In the pod, the texture of sepals and petals, the form of the latter, etc., this is close to the typical *Thelypodia*. The habit is not so essentially different either, but the sepals are spreading-reflexed and early deciduous as in *Stanleya* and the glands at the base of the stamens and the thickening of the pedicel, both so conspicuous in most thelypodioid plants, are here inconspicuous. The plant could not be included in *Stanleya*, on account of the short stipe, the different habit and the structure of the petals.

The genera may be distinguished as follows:

Sepals equal or nearly so; hairs simple or none.
- Sepals erect or ascending in anthesis.
  - Stigma distinctly lobed, its lobes expanded over the septum. *Thelypodiopsis.*
  - Stigma entire or, if indistinctly lobed, the lobes expanded over the valves.
    - Stigma truncate; sepals scarcely gibbous at the base.
      - Septum of the pod without a distinct midrib. *Thelypodium.*
      - Septum of the pod with a strong midrib. *Pleurophragma.*
    - Stigma conical; the outer sepals gibbous at the base. *Hesperidanthus.*
- Sepals strongly spreading or reflexed in anthesis, soon deciduous. *Stanleyella.*

Sepals unequal, the lower longer; hairs, at least some of them, stellate or branched, *Heterothrix.*

THELYPODIOPSIS gen. nov.

Biennials with rather thick and glaucous foliage and glabrous except the lower part of the stem. Basal leaves spatulate or oblanceolate, more or less toothed, with winged petioles; stem-leaves auriculate-clasping with rounded auricles. Sepals thin, erect or ascending, not gibbous, more or less petaloid, linear or oblong. Petals more or less clawed, white or purplish or in one species yellow. Filaments distinct, slender, filiform or subulate; anthers long, linear, sagittate at the base, soon spirally curved. Pod slender, terete, more or less torulose, usually with short stipe and style; stigma 2-lobed, the lobes expanded over the septum; cotyledons obliquely incumbent.

The first species of this genus as well as of the following new genera is regarded as the type.

Stipe very short, less than 1 mm. long or almost none; petals white or tinged with purple.
Style 2 mm. or nearly so.
Pod 7–9 cm. long. *T. elegans.*
Pod about 4 cm. long. *T. Bakeri.*
Style less than 1 mm. long; pod 5–7 cm. long. *T. wyomingensis.*
Stipe 2–5 mm. long; petals and sepals yellow. *T. aurea.*

Thelypodiopsis elegans (M. E. Jones).
Thelypodium elegans M. E. Jones, Zoe **4**: 265. 1893.
Thelypodiopsis Bakeri (Greene).
Thelypodium Bakeri Greene, Pl. Baker. **3**: 8. 1901.
Thelypodiopsis wyomingensis (A. Nelson).
Streptanthus wyomingensis A. Nelson, Bull. Torrey Club **26**: 126. 1899.
Thelypodiopsis aurea (Eastw.).
Thelypodium aureum Eastw. Zoe **2**: 227. 1891.

Thelypodium Palmeri sp. nov.

Biennial or perennial with a tap-root; stem 3–5 dm. high, sparingly hirsute below, glabrous above; basal leaves oblanceolate or spatulate, 2–4 cm. long, more or less hirsute beneath, especially on the veins; stem-leaves sagittate, 2–4 cm. long, glabrous or nearly so; inflorescence usually branched with ascending branches; pedicels nearly erect, 5–8 mm. long; sepals oblong, 3–4 mm. long; petals 5–6 mm. long, white or rose; claw about 3 mm. long; blade spatulate or oblanceolate; pod about 2–5 cm. long, 1 mm. wide.

This species has been confused with *T. sagittatum* (Nutt.) Endl., but differs in the smaller and narrower petals, nearly erect pedicels and narrow pod.

SOUTHERN UTAH: 1877, *E. Palmer 25* (type in herb. Columbia Univ.).

Thelypodium leptosepalum sp. nov.

Annual or biennial, glabrous throughout; stem 4–6 dm. high, branched; leaves thin, glabrous, 6–10 cm. long, lyrate-pinnatifid with lanceolate divergent lobes; flowering pedicels about 3 mm. long; sepals lance-subulate, 6 mm. long, 1–1.5 mm. wide at the base, white; petals narrowly linear-oblanceolate, almost strap-shaped, with scarcely any distinction between blade and claw, 8 mm. long, 0.5 mm. wide or less; filaments filiform, about 1 cm. long when well developed; anthers linear, sagittate at the base, soon curled.

This is closely related to *T. laciniatum* (Hook.) Endl., but differs in the narrow tapering instead of oblong sepals. It grows at an altitude of 450–600 m. on rocky banks.

IDAHO: Lewiston, Nez Perces County, 1896, *A. A. & E. Gertrude Heller 3022* (type in herb. Columbia Univ.); Valley of Peter Creek, Nez Perces County, 1892, *Sandberg, MacDougal & Heller 122.*

PLEUROPHRAGMA gen. nov.

Tall glabrous perennials or biennials with paniculate inflorescence and thick entire leaves. Basal leaves oblanceolate or spatulate; stem-leaves linear-lanceolate, sessile but not clasping. Sepals ascending, thin, more or less petaloid. Petals white or purplish with slender claws. Filaments distinct, subulate, white, somewhat dilated below and with conspicuous glands at their bases; anthers linear, sagittate at the base, curved. Receptacle dilated. Pod slender, terete, torulose, tapering at both ends into a short stipe below and a short slender style above; stigma minute, entire; septum with a strong midrib.

Pleurophragma integrifolium (Nutt.)

Pachypodium integrifolium Nutt.; T. & G. Fl. N. Am. 1: 96. 1838.

Thelypodium integrifolium Endl.; Walp. Rep. 1: 172. 1842.

Pleurophragma gracilipes (Robinson)

Thelypodium integrifolium gracilipes Robinson, Syn. Fl. 1[1] 176. 1895.

Pleurophragma platypodum sp. nov.

Glabrous perennial with a tap-root; stem simple up to the inflorescence, 1–2 m. high; basal leaves spatulate, 5–10 cm. long, entire; stem-leaves 3–6 cm. long, linear-lanceolate or oblanceolate, dark-green, thick; inflorescence paniculate; racemes dense, at first corymbiform, in fruit about 1 dm. long; sepals oblong, yellowish- or greenish-white, 4 mm. long; petals white, clawed, 6–7 mm. long; blades spatulate; pedicels in fruit about 3 mm. long, divergent or somewhat reflexed, dilated and flattened at the base, pod 1.5–2 cm. long, 1–1.5 mm. thick, torulose; stipe 1–2 mm. long; style short.

This is related to *Pleurophragma integrifolium* (*Thelypodium integrifolium* Endl.), but differs in the shorter inflorescence, the shorter pedicels, broadened at the base, the shorter pod with longer stipe and shorter style.

UTAH: Moab, 1891, *M. E. Jones* (labeled *Thelypodium Wrightii*, type in herb. N. Y. Bot. Garden).

ARIZONA: 1876, *E. Palmer*.

To this genus belongs also *Thelypodium lilacinum* Greene, Pl. Baker. 3: 9. 1901, if distinct from *T. integrifolium*. The only specimens at hand differ from that only in the stronger purple color of calyx and corolla. They are without fruit, which, however, may furnish distinctive characters.

HESPERIDANTHUS (B. L. Robinson) Rydb., gen. nov.

Thelypodium § *Hesperidanthus* B. L. Robinson, Syn. Fl. 1[1]: 174. 1895.

Erect, slender, glabrous perennials, with pale foliage; corymbosely branched above. Basal leaves obovate, toothed; stem-leaves linear, entire. Sepals rather firm, erect; the outer strongly saccate at the base. Petals purple, with obovate blades. Anthers linear, sagittate at the base, strongly curved. Stigma conical or ovate, neither truncate nor 2-lobed. Pod terete, linear, short-stipitate.

Hesperidanthus linearifolius (A. Gray).

Streptanthus linearifolius A. Gray, Pl. Fendl. 7. 1849.

Iodanthus or *Pachypodium linearifolium* A. Gray, Proc. Am. Acad. 6: 187. 1863.

Thelypodium linearifolium S. Wats. Bot. King's Expl. 25. 1871.

STANLEYELLA gen. nov.

Tall branched biennials. Leaves thin, the lower ones lyrately pinnatifid, the upper entire. Sepals thin, petaloid, white, oblong or linear, spreading or even reflexed in anthesis. Petals white, with oblanceolate or spatulate blades gradually tapering into a short claw. Filaments distinct, filiform; anthers linear, sagittate at the base, soon more or less spirally recurved. Pod slender, terete with short stipe and short style; stigma small, truncate or nearly so; cotyledons incumbent and somewhat conduplicate.

Stanleyella Wrightii (A. Gray)

Thelypodium Wrightii A. Gray. Pl. Wright. 1: 7. 1852.

HETEROTHRIX (B. L. Robinson) Rydb., gen. nov.

Thelypodium § *Heterothrix* B. L. Robinson, Syn. Fl. 1[1]: 178. 1895.

Slender biennials, more or less pubescent at least below with stellate or branched hairs. Basal leaves oblanceolate, more or less toothed; stem-leaves lance-linear or linear, entire. Racemes elongated, slender. Calyx more or less oblique, the lower sepals being longer than the upper, all ascending, rather firm and more or less purplish. Petals oblanceolate or spatulate, indistinctly or broadly clawed. Filaments subulate, broad at the base, distinct, scarcely exserted; anthers linear, sagittate at the base, spirally curved. Pod slender, terete, sessile; stigma minute, entire or slightly lobed, the lobes expanding over the septum; cotyledons obliquely incumbent.

Heterothrix longifolia (Benth.)

Streptanthus longifolius Benth. Pl. Hartw. 10. 1839.
Thelypodium longifolium S. Wats. Bot. King's Expl. 25. 1871.

Heterothrix micrantha (A. Gray)

Streptanthus micranthus A. Gray Pl. Fendl. 7. 1849.
Thelypodium micranthum S. Wats. Proc. Am. Acad. 17: 321. 1882.

CHLOROCRAMBE gen. nov.

Perennial glabrous herbs; stem simple at least up to the inflorescence. Racemes lax with slender horizontal or reflexed pedicels. Leaves thin, petioled, with usually hastate blades. Sepals greenish, ascending. Petals greenish-white, with short claws and lanceolate dentate blades. Anthers sagittate at the

base, linear-oblong, at last curved, greenish. Pod slender, somewhat torulose, short-stipitate and short-styled; stigma minute, entire.

The plant referred here has been included in *Caulanthus*, but the type of that genus, *C. crassicaulis*, and its allies have an urn-shaped, more or less closed calyx; linear, oblong, or spatulate petals, which have practically no claws, are thin and membranous except the upper third or fourth, which is thicker, brownish or purplish, curved and crisp; and a conspicuous, two-cleft stigma.

Chlorocrambe hastata (S. Wats.) Rydb.

Caulanthus hastatus S. Wats. Bot. King's Expl. 28. 1871.

Sophia magna sp. nov.

Annual; stem branched, 5–10 dm. high, sparingly stellate-puberulent or glabrous, stout; basal leaves twice to thrice pinnatifid, 1–2 dm. long, nearly glabrous; segments obovate, often toothed; stem-leaves similar but with narrower segments; sepals yellow, 2 mm. long, oblong; petals spatulate, nearly 3 mm. long, rather light-yellow; pedicels in fruit 15–20 mm. long, ascending; pod glabrous, more or less clavate, 12–15 mm. long, 1.5–2 mm. thick; seeds more or less in two rows.

This species is related to *S. intermedia* and *S filipes*, but differs from both in the broad segments of the basal leaves. In habit it therefore resembles *S. incisa*, but has an evidently clavate pod. It has the conspicuous flowers of *S. filipes*, but the terminal segment of the leaves is not elongated. It was first mistaken for *S. brachycarpa*; but the style is evident although short. It grown on river-bluffs at an attitude of 1500–2500 m.

COLORADO: North of La Veta, 1900, *Rydberg & Vreeland 6163* (type in herb. N. Y. Bot. Gard.); South of La Veta, *6162*; Plains near Denver, *6164*.

Sophia Nelsonii sp. nov.

Slender annual; stems 2–4 dm. high, slightly stellate or glabrate; leaves pinnatifid or bipinnatifid with linear or oblong divisions, slightly stellate or glabrate; sepals oblong, 1 mm. long; petals light-yellow, spatulate, 1.5 mm. long; fruiting pedicels ascending, 4–6 mm. long; pods clavate, 5–8 mm. long, glabrous, slightly over 1 mm. thick; style minute.

This species is probably nearest related to *S. intermedia*, but

differs in the shorter pod and pedicels and the smaller flowers. From *S. pinnata* it differs in being nearly glabrous and by the shorter pedicels and the erect pods. It grows on gravelly flats, sandy plains and rocky hills, at an attitude of 1300–2000 m.

WYOMING : Wraith Falls, Yellowstone Park, 1899, *Aven Nelson & Elias Nelson 5710* (type in herb. N. Y. Bot. Gard.); Green River. 1895, *Rydberg*; Fort Steele, 1901, *Tweedy 4479* and *4480* (?),

UTAH : Salt Lake City, 1884, *Leonard 212*.

Arabis oreophila sp. nov.

Arabis Drummondii alpina S. Wats. Bot. King's Expl. 17, in part. 1871.

Perennial with a more or less branched caudex; stems 1–2 dm. high; basal leaves numerous, broadly oblanceolate or spatulate, stellate-pubescent; stem-leaves rather few, lanceolate, slightly auriculate-clasping; sepals oblong, 3–4 mm. long, margined with purplish, obtuse, glabrous; petals 7–8 mm. long, yellowish-white below, upper portion rose or purplish; pedicels 4–10 mm. long, erect or ascending; pods glabrous, 3–6 cm. long, slightly arcuate, 2 mm. wide, acute, but beak obsolete; seeds in 2-rows, winged above and on one side.

This species is nearest related to *A. Lyallii* S. Wats., and was included therein, but differs in the broader and shorter basal leaves, which are decidedly stellate, and in the pod which lacks a distinct beak. It grows on the higher mountains at an altitude of 2500–3500 m.

UTAH : Divide between Big Cotton-wood Cañon and Heber Valley, 1905, *Rydberg & Carlton 6678* (type in herb. N. Y. Bot. Garden, flowers and young fruit); Alta, 1879, *Jones 1248* (fr.); Uintas, 1869, *Watson 75* (fl.)

WYOMING : Union Peak, 1894, *A. Nelson 1007* (fl.); upper Buffalo Fork, 1899, *C. C. Curtis*.

MONTANA : Old Hollowtop, 1897, *Rydberg & Bessey* (fl.).

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